

MR039L Toxicological Assessment Using the Carbon Dioxide Monitor Kit (CDMK)

3.2 Medical Requirements Overview

TABLE 3.2: MEDICAL REQUIREMENTS OVERVIEW

MRID# and Title:	MR039L Toxicological Assessment Using the Carbon Dioxide Monitor Kit (CDMK)
Sponsor:	Medical Operations
Discipline:	Environmental Health
Category:	Medical Requirements
References:	ISS Medical Operations Requirements Document SSP 50260
Purpose/Objectives:	To detect and quantify carbon dioxide (CO ₂) in the air on-board the ISS. Measurements will be taken in areas where elevated levels of CO ₂ may exist, and data from fixed CO ₂ sensors is not available.
Measurement Parameters:	In-flight CO ₂ levels.
Deliverables:	Real-time crew call downs of CO ₂ levels In off-nominal or contingency events when extensive monitoring is required, a post-event report evaluating the data collected will be provided.
Flight Duration:	≥ 30 days
Number of Flights:	Every ISS Increment
Number and Type of Crew Members Required:	One crewmember (CM) is trained in all Environmental Health System (EHS) activities (US Specialist). All CMs are trained in EHS Toxicology Operations. One CM will perform the in-flight activity.
Other Flight Characteristics:	N/A

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3.3 Preflight Training

TABLE 3.3: PREFLIGHT TRAINING

Preflight Training Activity Description:	All crewmembers are trained in Environmental Health System (EHS) Toxicology Operations.			
	Duration:		Schedule:	Personnel Required:
Schedule:	EHS Assessment: 90 minutes		See MA/ITP Schedule	Instructors/ Crewmembers
Ground Support Requirements Hardware/Software	Preflight Hardware:		Preflight Software:	Test Location:
	Carbon Dioxide Monitor Kit CSA-CP Data Cable Station Support Computer (SSC)		CDM Software on SSC	U.S.
Training Facilities	Minimum Room Dimensions:	Number of Electrical Outlets:	Temperature Requirements:	Special Lighting:
	29' x 14'	One	Ambient	N/A
	Hot or Cold Running Water:	Privacy Requirements:	Other:	
	N/A	N/A	1 Table & 6-8 chairs	
Constraints/Special Requirements:	None			
Launch Delay Requirements:	Refresher training will be available upon crewmember request.			
Notes:	EHS Assessment includes training for CDMK, Grab Sample Containers (GSCs), Formaldehyde Monitor Kit (FMK), Compound Specific Analyzer – Combustion Products (CSA-CP), Portable Oxygen Monitor (POM), Portable Gas Delivery System, and Air Quality Monitor (AQM). USOS or Russian Crewmembers who have completed ASCAN Training or have flown before will complete the EHS Assessment.			

3.4 Preflight Activities – No Preflight Activities

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3.5 In-Flight Activities

TABLE 3.5.1: IN-FLIGHT ACTIVITIES -

In-Flight Activity	Description:	<u>CO₂ Sampling: Carbon Dioxide Monitoring Kit (CDMK):</u> Measurement of CO ₂ levels is taken real-time by the CDM during various activities in flight..			
		Duration:	Schedule:	Flexibility:	Personnel Required:
		Unstow: 5 minutes CO ₂ Sampling Session: Activity dependent Stow: 5 minutes	As Needed	N/A.	1 Crewmember
Procedures:	Procedures are contained in the Systems Operations Data File (SODF), Med Ops Book				
Constraints / Special Requirements:	<ul style="list-style-type: none"> If CDM is used for personal monitoring, it should not be in the path of exhaled breath. If CDM is without power for more than 10 hours, data stored in the Data Logger will be lost and the CDM will not record data unless the Data Logger is cleared. Real-time measurements can still be made. 				
Photo / TV Requirements:	Photo documentation will be requested on an as needed basis, typically following reports of CO ₂ levels that exceed the 7-day SMAC.				
Cold Stowage Requirements:	N/A				
Mission Extension Requirements:	N/A				
Landing Wave-Off Requirements:	N/A				
Notes:	The CDM has approximately 8 - 14 hours of operational life on a single battery pack. During battery change-out, stored data are maintained for a maximum of 30 minutes without battery installed. All data will be lost if battery installation is delayed more than 30 minutes. MCC-H is notified upon the completion of battery change-out.				
Data Delivery	Upon completion of the CO ₂ sampling, the concentration (reported as %) and sampling information are called down to MCC-H and may be recorded in crew notes, IPV, or .xml. For extensive monitoring sessions, data will be downloaded and downlinked to MCC-H. The JSC Toxicology and Environmental Chemistry (TEC) Laboratory will evaluate all downlinked data and provide an assessment to the Crew Surgeon as soon as possible. Any significant findings resulting from CDM measurements will be included in the final Increment Toxicology Report. The final Increment report will be posted to the JSC Toxicology website no later than 3 months after analysis of all Increment samples is completed.				

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TABLE 3.5.2: IN-FLIGHT HARDWARE

Hardware/Software Name
Carbon Dioxide Monitor Kit (CDMK)
Filter Assembly
Belt Pouch Assembly
Belt Assembly
CSA-CP Data Cable
CDM
CSA-CP/CDM Battery Pack
Station Support Computer (SSC)
Carbon Dioxide Monitor (CDM) Software on SSC

3.6 Postflight Activities – No Postflight Activities

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3.7 Summary Schedule

TABLE 3.7: SUMMARY SCHEDULE

ACTIVITY	DURATION	SCHEDULE	FLEXIBILITY	PERSONNEL REQUIRED	CONSTRAINTS
Preflight Training					
EHS Assessment	90 minutes	See MA/ITP Schedule	N/A	Instructors/ Crewmembers/	Requires SSC with CDM Software
Preflight – N/A					
In-Flight					
CO2 Sampling	Unstow: 5 minutes Sampling Session: Activity dependent Stow: 5 minutes	As Needed	N/A	1 Crewmember	<p>If CDM is used for personal monitoring, the CDM should not be in the path of exhaled breath.</p> <p>If CDM is without power for more than 10 hours, data stored in the Data Logger will be lost and the CDM will not record data until the Data Logger is cleared. Real-time measurements can still be made.</p> <p>Photo documentation will be requested on an as needed basis, typically following reports of CO₂ levels that exceed the 7-day SMAC.</p>
Postflight – N/A					
Postflight Debrief					
Debrief	No extra time	~R+30 days	N/A	Crewmembers/ Toxicology Team	Included as part of nominal Med Ops debrief